

Morgan-Thomas, A. (2018) Schatzki and techno-organizational practice. In: Mitev, N., Morgan-Thomas, A., Lorino, P., de Vaujany, F.-X. and Nama, Y. (eds.) *Materiality and Managerial Techniques: New Perspectives on Organizations, Artefacts and Practice*. Series: Technology, work and globalization. Palgrave Macmillan: Cham, Switzerland, pp. 307-324. ISBN 9783319661001.

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Deposited on: 31 May 2019

# Schatzki and Techno-Organizational Practice

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## **Introduction**

Focusing on the ontological principles of practice, this chapter explores a possibility of an activity-based view of sociomateriality. Although practices have been central to our understanding of techno-organizational phenomena and research on sociomateriality extensively draws on practice theories (Barad, 2003; 2007; Latour, 2005; Schatzki, 1996; 2002), the application of practice theory to sociomaterial enquiry has been somewhat partial for at least three reasons. Firstly, the treatment of practice and the corresponding debates have tended to prioritize epistemology over ontology. That is, discussions on how to research socio-material phenomena have dominated (Orlikowski & Scott, 2015) and insufficient attention has been devoted to the metatheoretical dimension of practice and its philosophical assumptions (Cecez-Kecmanovic, 2016). Metatheory concerns the metaphysical principles that inform the very basic assumptions behind the theory, assumptions that define the notion of reality, existence, humanity, society and the entities within it (Burrell & Morgan, 1979). Whilst significant effort has aimed at explicating sociomateriality and setting it apart from competing paradigms in information studies and beyond (Leonardi, 2012; 2013; Orlikowski, 2007; 2009; Orlikowski & Scott, 2008; 2015), scarce emphasis has been paid to its metaphysical assumptions and their consequences. In particular, there are limited efforts explicating the metaphysical dimensions of practice theories and the implications of the contrasting assumptions within competing theories of practice (Schatzki, 2002).

Secondly, whilst drawing on the theories of practice, sociomateriality has tended not to recognize the differences in metaphysical assumptions between the practice theories of actions (Schatzki, 1996; 2002; 2010; Reckwitz, 2002; 2012) and theories of arrangements (Barad, 2003, 2007; Callon, 1991; Latour, 2005). The former conceive of practices as nexuses of ‘doings and sayings’ whilst the latter frame practices in terms of constellations of actors that include non-human actors. These distinctions seem somewhat obscured in sociomaterial enquiry and key authors tend to cite multiple theorists of practice without drawing attention to significant differences between their conceptions of practice (see e.g. Orlikowski & Scott, 2014).

Thirdly, whilst drawing on the broadly conceived theories of practice, sociomaterial research tends to favor theories of arrangements (Barad, 2003; 2007; Latour, 1992; 2005). That is, empirical studies tend to focus on the assemblages of different actors that include non-human entities and networks of relationships between the actors that produce practice. In general, within published research, the works based on the theories of arrangements dominate and the theories of actions remain overlooked in sociomaterial research (e.g. Mazmanian et al., 2014; Scott & Orlikowski, 2014).

Unquestionably, the conceptual orientation towards epistemology of objects (Knorr Cetina, 1997) and arrangements (Latour, 2005) has strengthened sociomateriality research and has provided a useful theoretical lens for the empirical study of technology-practice nexus. Nonetheless, the shift towards arrangements deflects attention from metaphysics of practice and downplays the implications of activity for technology in the organizational practice. As a consequence, our understanding of how individual actions with technology convert into sustained manifolds of organizational activity, how the

actions of multiple individuals with multiple technologies come to bear on the unfolding of organizational realities over time and across space, and how shared understanding, meanings, human intentions, emotions and affect practice with/in/through technology remains only partial.

In an attempt to rebalance the theoretical repertoire within organizational research on technologies, the current chapter explores the possibility of an activity-based theory of sociomateriality. In extending Schatzki's (1996, 2002, 2010, 2013) practice theory to the study of techno-organizational phenomena, the specific objectives here are to examine the ontological status of practice in sociomateriality research and to offer an activity-based conceptualization of socio-material practice. The key argument advanced in this chapter is that a theory of actions may address sociomaterial 'doing' and account more fully for the role of technology in organizing. Schatzki's theory of practice (2002) seems particularly well suited to the task because its detailed specification of practice provides a comprehensive metaphysical and metatheoretical account of sociality that defines practice, stipulates a range of relationships between materiality and action, and offers possibility of adding specificity to the material, discursive and symbolic relations between technology and organizational practice. Admittedly, whilst promoting one view of practice, the chapter also acknowledges that this is but one theory and that diversity of approaches is warranted and indeed desirable. The purpose here is to enrich rather than seek conceptual closure for the study of socio-technical phenomena.

The chapter aims to make three contributions to the study of techno-organizational phenomena. Firstly, by examining how theories of practices have been conceptualized and analytically deployed in the study of sociomateriality, the paper

provides important insights concerning the metaphysical status of practice and the implications of metatheory of practice for the techno-organizational research. Secondly, by explicating how Schatzki's treatment of practices differs from alternative approaches and how its use may be advantageous in the study of socio-technical phenomena, the paper challenges the assumption that an activity theory does not lend itself for the study of technologies in organizing. Thirdly, by extending Schatzki's theory of practice to the study of techno-organizational phenomena, the study offers a novel application of an activity theory.

### **Conceptual background**

Although sociomateriality research acknowledges the centrality of practices as the ontological building blocks of organizational realities (Orlikowski & Scott, 2015) and practices represent a common concern in empirical research (Jones, 2014; Jung & Lyytinen, 2012), a closer reading of the literature reveals an important fault line. Studies tend to analytically privilege either entities or actions and the scholarship seems split between studies relying on theories of arrangements (Barad, 2007; Callon, 1991; Latour, 2005) versus those sympathetic to theories of activities (Feldman & Orlikowski, 2011). The former conceive of social life as essentially revolving around arrangements of entities where social phenomena are organized in configurations and connections: humans and non-humans are interlaced into arrangements, which exert influence on other configurations and through relations perpetuate social life (Barad, 2003; 2007; Latour, 1991, 2005). The latter, theories of actions, explore situated actions in contexts (Schatzki, 1996, 2002; Reckwitz, 2002) and their focus is on patterns of activities across groups of individuals.

The emphasis on the theories of arrangements is much evident in recent sociomateriality research. For example, the work of Orlikowski and Scott (Orlikowski & Scott, 2013; 2014; Scott & Orlikowski, 2014) builds on Barad's philosophy (Barad, 2003; 2007) and focuses on entanglements of humans and non-humans, the social and the material (Orlikowski & Scott, 2008). Similarly, past research that draws on actor-network theory (Mazmanian et al., 2014; Osterlie et al., 2012) provides important extension of the arrangement theme. Concepts such as 'imbrication' (Leonardi, 2011), 'assemblage' (Suchman, 2007), 'mangling' (Venters et al., 2014), or 'configuration' (Mazmanian et al., 2014) all draw on the notion of arrangements of entities. Evidence of metatheories of arrangements can be also found in sociomateriality's metaphysical assumption - the relational ontology. Following Barad (2003, 2007), past research has assumed that phenomena do not pre-exist but tend to emerge through relations in practice (Orlikowski & Scott, 2015) and material and non-material entities perform practices in an ongoing fashion. Contrasted with the research on arrangements, to date, only a few studies have attempted to explore techno-organizational phenomena using the activity lens (e.g. Fayard & Weeks, 2014; Jones, 2014; Jung & Lyytinen, 2012; Leonardi, 2011). Considering the number of studies in top journals, the focus on arrangements seems to dominate the current sociomaterial thinking.

Despite its success in redirecting attention to the situated and emergent nature of technology in organizational practice and the significant strides in rebalancing human-non-human relations in technology research, the shift to theories of arrangements in techno-organizational research has been extensively criticized (Faulkner & Runde, 2012; Jones, 2014; Kautz & Jensen 2012; 2013; Mutch, 2013). For example, the sociomaterial

search for balance between human and non-human actors seems to be met with only partial success. Human actors tend to dominate empirical evidence because they are the only ones that speak (Mutch, 2013). Yet paradoxically, in order to make room for objects, the sociomaterial efforts to equalize humans and non-humans within assemblages tend to suppress humanity. As a result, the implications of human intentions, emotions and affects are largely missing from current studies (Jones, 2014), in spite of their mattering for practice (Rezkwitz, 2012).

There are problems concerning specificity and generalizability of insight. The preoccupation with specific narrowly defined settings brings difficulties in accounting for broader symbolic and social elements of practice that include the implications of the past (Mutch, 2013). The entanglements between humans and non-humans are necessarily situated in specific, narrowly defined contexts (e.g. call centers, TripAdvisor) and the specificity makes it difficult to extend the findings and generalize across other situations and context.

The analytical efforts to move from individual actions with objects to sustained patterns and manifolds of activity - across groups of individuals and underlined by shared understanding and meaning - are yet to develop into comprehensive theories of organizing (Fayard & Weeks, 2014). The micro-emphasis on networks on human-non-human relations seems to offer an individualistic locus of practice and ignores both the complex webs of cultural knowledge and rules that accompany technology use across groups of individuals (Hutchby, 2001) and the social construction of technology impacts on practices. Assemblages do not recognize the broader fields of practice (Bourdieu, 1977; 1990) or the broader networks of relationships in a group and society that create

the conditions for practice (Fayard & Weeks, 2014).

Further difficulties concern relational emergence. Sociomateriality claims that practices emerge through relations and that everything that exists is continually created and recreated through relations (Barad, 2003; 2007). Yet, when addressing technology in organizing, studies tend to resort to pre-existing categories and emergence does not seem to be easily accommodated either empirically or conceptually (Faulkner & Runde, 2012; Mutch, 2013). The critics of sociomateriality have claimed that ‘many if not most of the boundaries and categories we live by in our day-to-day lives are generally quite stable, at least relative to our life-histories, and that the same is true of most of the objects classified within them’ (Faulkner & Runde, 2012, 60). The concurrent notions of entanglement and emergence are proving difficult to implement in empirical analysis (Mutch, 2013).

Past efforts to address these criticisms and move the field forward have involved expositions and critical syntheses (Cecez-Kecmanovic, 2016; Jones, 2014; Orlikowski & Scott, 2015). For example, significant efforts have concerned decomposing the sociomateriality program to explicate its principal components and contrast with alternatives (Leonardi, 2012; 2013; Orlikowski, 2007; Orlikowski & Scott, 2015). Alternatively, critical syntheses have addressed the program from the epistemological perspective, highlighting how its principles translate into a body of research and what knowledge does such program generate (Cecez-Kecmanovic, 2016; Cecez-Kecmanovic et al., 2014; Jones, 2014). For example, Jones (2014) has argued that though the principles of materiality, inseparability, relationality, performativity, and practices, represent a radical departure from other research traditions, the level of adherence to



these principles remains varied and marks the split within the field into weak and strong sociomateriality.

While these explanations and the ensuing recommendations are insightful and useful, they do not question the basic ontological premises underpinning the framework of sociomateriality. Paradoxically, neither the existing expositions of theory nor the critiques seem to offer a systematic treatment of metatheory i.e. the fundamental ontological assumptions on which research is based and which drive epistemological decisions on what research problems to focus on and how research should be carried out. The outcome is a level of epistemological confusion as evidenced by the varied and selective application of sociomateriality principles (Cecez-Kecmanovic et al., 2014). The confusion also affects critiques of the program because the act of bundling and evaluating theories that are incomparable because they belong to different metaphysical paradigms seems to trespass the principle of paradigm incommensurability (Burrell & Morgan, 1979).

In an effort to address ontological principles in socio-technological research, the next section reviews meta-theories of practice. The review provides an opportunity to reassess metatheoretical principles and map out the sociomateriality program more clearly. By explicating commonalities and differences using established categories, the chapter hopes to explicate the metaphysical principles in a systematic manner.

### **Metatheories of practice**

Practice theories represent a rich theoretical terrain that permeates research in multiple fields of management and organizational studies (Feldman & Orlikowski, 2011). In general, practice theories seek to explain the relationship between specific and situated

human actions and the broader social context in which these actions take place (Schatzki, 2002). Although the theories vary in their explanation of the principles and mechanism that link individual action with the broader social context, they share a focus on actions, reject dualism and accept the principle of mutual constitution (see Feldman & Orlikowski, 2011 for a good overview). Practice theories assume that social life is composed of everyday actions and that manifolds of actions across groups of individuals create practices (Schatzki, 2002). In denying dualism, practice theories reject oppositions (e.g. structure and agency, individual and institutional, cognition and action) and call for the construction of dualities that accommodate the polar extremes (Reckwitz 2002). Finally, practice theories assume mutual constitution to claim that phenomena always exist in relation to each other. For example, social orders depend on human agency that produces them and conversely, human agency is shaped by social orders that determine its structural conditions (Feldman & Orlikowski, 2011).

Despite similarities, practice theories differ in their metatheoretical assumptions. A key shared assumption is that any form of social life transpires through practices, or organized patterns of human activities, and that practices are the fundamental blocks building social life in multiple domains (Orlikowski & Scott, 2015). However, although all theories of practice focus on situated activities, they differ by privileging of either entities or actions and theories of arrangements (Latour, 2005; Barad, 2003) can be contrasted with theories of actions (Bourdieu, 1977; Schatzki, 2002; Reckwitz, 2002). The division is important because it underlies fundamental metatheoretical differences that pertain to the conception of social life and the role of objects. The two streams within practice theories take an opposing stance regarding the emergence of practice and the

relative position of humans within that emergence. As a result, the two strands adopt contrasting views concerning humanism, nominalism and the emergence of practice (Schatzki, 2002).

The first distinction concerns humanisms versus post-humanism. Humanism tends to privilege humans over non-humans and assume that although objects, entities and non-human phenomena (i.e. wind) may act and exert influence, they do not have agency because agency is uniquely human involving intentions. Whilst acknowledging the importance of matter, humanism maintains the superiority and primacy of humans over non-humans. By contrast, post-humanism (Knorr Cetina, 1997) attributes central features of human agency to non-human entities and downplays the uniqueness and significance of human agency. The key distinction between the two strands of practice theories is that theories of actions defend the privileged position of human agency whereas theories of arrangements equate human and non-human agency.

The second difference concerns nominalism versus contextualism. Whilst nominalism contends that sociality can be explained solely through properties and relations among particular things, contextualism assumes that these matters must be referred to a context that is different from these entities. Nominalists deny existence of context and to them, systems, structures or social orders either do not exist or are merely configurations of arrangements that are infinitely reducible to arrangements. By contrast, conceptualists acknowledge the importance of a wider context and recognize broader structures as well as the historical dimension of practice. Importantly, the theories of actions adhere to contextualism whilst theories of arrangements follow nominalism.

Nominalism has important implication for the substantive status of practices.

Denial of context and focus on ongoing relations conveys the rejection of substantivism (preoccupation with the real) and attention to relational ontology and performativity where practices are an ongoing accomplishment that is continuously unfolding and becoming. Though stabilization may be achieved temporarily, neither the practices nor any other entities involved in their productions are ever ‘completed’ or fixed (Barad, 2007). By contrast, theories of actions seem more aligned with substantivism and emphasize ‘the real’ and ‘the actual’. Though practices may be an ongoing accomplishment that is co-constituted by multiple actors, the theories of actions argue that the presence of practice can be objectively and independently detected because they practices have relatively stable and detectable characteristics that are independent from their observer.

Taken together, post-humanism and nominalism that characterize theories of arrangements bring certain challenges to the study of techno-organizational phenomena. For example, the focus on unfolding, unstable and unbounded assemblages of human and non-human entities means that it becomes analytically difficult to separate them in what is being examined (Kautz & Jensen, 2012; 2013) and there are issues concerning the empirical locus of concrete analyses. A related problem concerns indeterminacy. For example, the notion of ‘relationality’ advanced by Barad (2003, 2007) provides little specificity to the multiple types of relations between the social and the material (Faulkner & Runde, 2012). Concurrently, the focus on immediate objects (like TripAdvisor in Orlikowski & Scott, 2014) comes at an expense of the more generalized theoretical propositions that apply beyond the immediate empirical setting (Mutch, 2013). Consequently, the debate as well as the search for alternative lenses continues (Cecez-

Kecmanovic, 2016). The section below exposes Schatzki's theory of practice as a possible new direction for sociomateriality research.

### **Activity-based theory of sociomateriality?**

Schatzki (1996; 2002) offers but one theory of practice. Similar to other practice theorists (Bourdieu, 1977; Reckwitz, 2002; Latour, 2005), Schatzki assumes that practices are the key ontological units of which sociality is composed. Similar to other theorists of practice, Schatzki rejects individualism and individualist ontologies and supports the principle of mutual constitution where sociality envelops though manifolds of activities across groups of individuals and where activity is constitutionally bound with matter. Contrasted to other theorists, Schatzki makes a strong emphasis on actions – 'doings and sayings' – and conceives of practices as 'manifolds of actions'. Building on Heidegger and Wittgenstein, he further assumes that action takes primacy over meaning.

According to Schatzki (1996), practices are organized bundles of human activity, evolving domains of doings and sayings that are linked by and orchestrated through arrays of understandings, rules and teleo-affective structures. Practical understandings denote the skills, abilities and capacities that inform and help execute the specific actions that compose a practice. Understandings are accompanied by sets of rules i.e. formulations, principles or instructions that orient, direct and determine the course of activity. Finally, teleo-affective structure of practice consists of a set of ends, projects, tasks, beliefs and emotions that are expressed in doings and sayings that compose the practice. Unlike rules, teleo-affective structure tends to be implicit and suggestive of normativity and hierarchy within a practice; when it exists, there is a general agreement about rightness, 'oughtness' or acceptability of action. A bundle of activities becomes a

practice when it displays the three features discussed above.

Although the thrust of Schatzki's theory concerns social aspects of practice, materiality and technology form an integral part of his thinking because 'activity is inherently entwined with objects and it proceeds amid entities that mold it and to which it is constitutionally bound' (2002, 124). Practices are intrinsically entangled and interwoven with objects and materiality has compositional significance for practice. That significance is reflected in later definitions of practice where 'social life, that is human coexistence, inherently transpires as part of nexuses of practices and material arrangements' (Schatzki, 2010, 124). According to Schatzki (2010), material arrangements are sets of entities that include humans, artefacts, and organisms. Similar to other thinkers (Leonardi, 2012), he understands that materiality is broader than physicality and refutes the notion that materiality forms but a background condition for social practice, as sustained in mainstream sociology (see e.g. Garfinkel, 1967 or Giddens, 1979).

How are objects entwined with practices? There are four mechanisms that tie practices and material arrangements: causality, constitution, intelligibility and prefiguration (Schatzki, 2010). Causality captures the direct influence of actions on objects, objects on actions and objects on objects. Human activity may lead to changes in objects: humans may create new objects, for example, alter objects, and rearrange objects. Similarly, material entities may exert causal effects on human actions and lead them to perform activities, follow tasks and pursue ends. Finally, objects maintain causal relations among themselves, for instance, an app may cause a heating boiler to switch on.

The second mechanism concerns constitution and practices and material

arrangements are co-constitutive in that without objects a practice may not exist or take a completely different form. Firstly, objects may be essential for practice in that it may be impossible to carry out activities that compose practice without certain objects. For example, the practice of online valuation is made possible through digital algorithms and immaterialities that support it. Online valuation occurs only when these materialities are present and functioning in a satisfactory manner (Orlikowski & Scott, 2015). Secondly, objects may be pervasively involved in particular practices at particular times and places. Jones (2014), for example, notes that though it is not essential to use objects in medical practice, the contemporary medical practices are pervasively entangled with objects. Co-constitution works in the opposite direction too: without the practices that involve objects or are carried out among objects, many material arrangements would not exist. For example, a typewriter is now an obsolete object within the contemporary writing practice because more efficient writing tools (word processors) have emerged.

The third type of relation between practices and arrangements is that of intelligibility. Intelligibility ‘governs action by specifying what an actor does next in a continuous flow of activity’ (Schatzki, 2001, 75) and denotes how things make sense (what are they understood to be) and which actions make sense - what makes sense for people to do. The material arrangements within practice carry interwoven understandings of that practice: a set of technologies for online valuation carries the understanding of valuation (Orlikowski & Scott, 2015). To say that objects and practices are tied through intelligibly is to assume that objects articulate the meaning of practice and signify the actions to perform i.e. they help to channel ‘the flow of unreflective action onto the performance of particular actions’ (Schatzki, 2001, 122).

The final type of mechanism that ties practices and objects is prefiguration. Objects prefigure practices by shaping, influencing and affecting the future actions that compose practice, specifically, in the very immediate future. Though prefiguration may be conceptualized through the notion of constraint or possibility, or fields of possibilities, Schatzki argues that such formulations unduly minimize its influence on practice because prefiguration is only to a small extent a matter of constraint/affordance and exclusion/possibility (Schatzki, 2002, 225). To understand prefiguration is to appreciate the multiple ways that the mesh of practices and arrangements ‘makes courses of action easier, harder, simpler, more complicated, shorter, longer, ill-advised, promising of gain, promising of ruin, disruptive, facilitating, obligatory and proscribed, acceptable or unacceptable, more or less feasible’ (Schatzki, 2002, 231). Prefiguration is not about opening or closing paths for action but is best understood ‘as a qualification of possible paths of action on such registers as easy and hard, obvious and obscure, tiresome and invigorating, short and long, and so on’ (Schatzki, 2002, 103).

Whereas objects are pervasively implicated in practices in multiple domains, Schatzki refutes the notion of ontological equality of humans and objects, argues against taking these notions too far and defends ‘residual humanism’. Specifically, for Schatzki, there is a distinction between ‘centeredness’ (Knorr Cetina, 1997) and being ‘tied to’ or ‘moderated by’. In opposition to Knorr Cetina, he argues that colonization of objects of multiple arenas of contemporary practice does not entail centeredness. Objects are very rarely the focus of practice. Practices serve tasks, projects and ends that go beyond objects and are not centered on the objects *per se*. Instead, objects play role in practices due to their usefulness in meeting ends, projects and tasks that the practice stipulates.



## **Implications**

As an alternative lens for viewing socio-technical entanglements, activity theory has implications for technology research. From the ontological perspective, the theory provides a complete metatheory that systematically accounts for all aspects of practices thus offering the possibility to address some criticisms concerning theories of objects. For example, contrasted with Barad (2007), Schatzki (1996: 2002; 2010) provides a more complete understanding of materiality and sociality by specifying what practices are, why they matter and how they differ from entities. His rich philosophical account of practice provides detailed guidelines for identifying and analyzing practice-materiality nexuses. The rejection of nominalism means that it becomes possible to separate the empirical focus from the research context; it becomes easier to locate, exclude and prioritize research settings and thus avoid the fallacies of infinite regress and indiscrimination. A key advantage of the focus on practice is that it allows for theorizing about multiple-technologies, technological meshes and technology choice that seem to increasingly form an intrinsic feature of contemporary organizational technologies (Jung & Lyytinen, 2013).

These advantages become more apparent when viewed from an epistemological perspective and the distinction between practice and phenomenon (Barad, 2007) becomes important here. In contrast with the difficult to locate seemingly boundary-less phenomena (particularly when viewed thorough Barad's compounded onto-epistemological standpoint), the focus of activity-based practice seems to offer more precision. In particular, definitional precision means that it may be easier to observe and refute practices than phenomena. Contrasted with phenomena, practice seems to have a

set of qualifying features that are not entirely dependent upon the observer. Because the observation of practice separates an observer from the object of observation (practice), it avoids the indeterminacy of phenomena where the agency of observation and the observed are combined (Faulkner & Runde, 2012).

How may an enquiry be facilitated by activity theory? The starting point would involve identification of practices and associated material bundles. Using Orlikowski and Scott (2015) as an example, an investigation that contrasts offline and online valuation practices would still occupy the middle ground position in terms of rejecting duality and determinism. However, the empirical design would place greater emphasis on doings (valuations) in terms of understandings, rules, structures that would implicate materialities of different practices (including digital and non-digital objects) and their relationships with tasks, projects and ends. These relationships would stipulate how materialities are implicated in the different castings of valuation practice through causality, intelligibility, co-constitution and prefiguration.

Some disadvantages of activity theory have to be acknowledged. Unlike the theories of arrangements, the activity view has not been developed with objects in mind, not least the quasi objects of digital type (Faulkner & Runde, 2011) and translating its propositions into the realm of technology and organizing is not an easy undertaking. The difficulty is compounded by the theory's emphasis on ontology and almost absolute absence of epistemological guidelines. By his own admission, Schatzki (2002) is not preoccupied with epistemology and thus provides little assistance in extending the theory to empirical designs. Beyond these concerns, the major issue is agential humanism and the somewhat diminished role of objects that follows from activity theory. These

ontological assumptions run contrary to the principle of equivalence between humans and objects which represents a key attraction of the sociomateriality program.

## **Conclusion**

This chapter aims to advance techno-organizational research by offering an activity perspective on human-object relations. By revisiting the notions of post-humanism and nominalism and exploring the activity-based view of sociomateriality, the chapter offers a revised option of practice theory that may be used by organizational scholars in technology studies. The chapter argues that the activity view offers advantages by providing boundaries to the phenomena under investigation and by accommodating the context of practice and thus sets new avenues for empirical research on techno-organizational phenomena. Given the increasing proliferation of multiple organizational practices with information technologies such work seems highly warranted and urgently needed.

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